

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
7 April 2005 (07.04.2005)

PCT

(10) International Publication Number
WO 2005/030330 A1

(51) International Patent Classification⁷: **A61N 7/02, 5/10**

(21) International Application Number:
PCT/IB2004/051741

(22) International Filing Date:
10 September 2004 (10.09.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/507,634 30 September 2003 (30.09.2003) US

(71) Applicant (for all designated States except US): **KONINKLIJKE PHILIPS ELECTRONICS, N.V.** [NL/NL]; Groenewoudseweg 1, NL-5621 BA Eindhoven (NL).

(71) Applicant (for AE only): **U.S. PHILIPS CORPORATION** [US/US]; 1251 Avenue of the Americas, New York, New York 10020 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **STECKNER,**

Michael, C. [CA/US]; 595 Miner Road, Cleveland, Ohio 44143 (US). **BOERNERT, Peter** [DE/NL]; Groenewoudseweg 1, NL-5621 BA Eindhoven (NL). **NEHRKE, Kay** [DE/NL]; Groenewoudseweg 1, NL-5621 BA Eindhoven (NL).

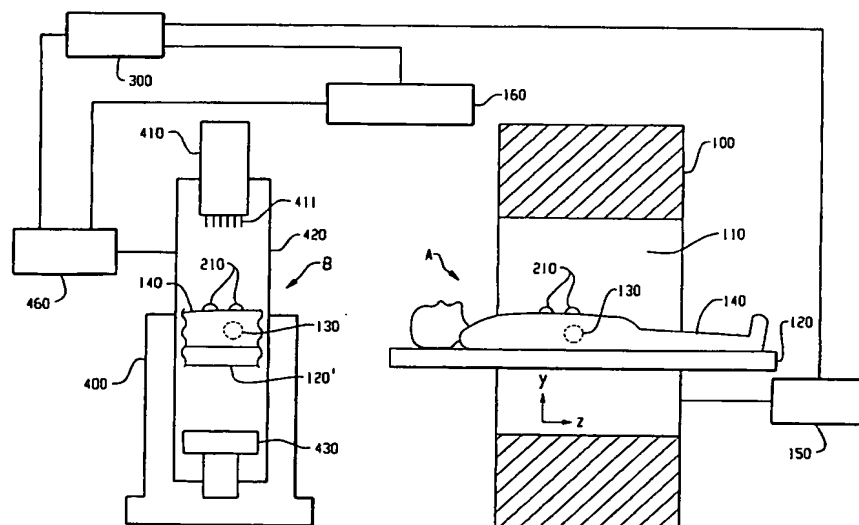
(74) Common Representative: **KONINKLIJKE PHILIPS ELECTRONICS, N.V.**; c/o LUNDIN, Thomas, M. 595 Miner Road, Cleveland, Ohio 44143 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),

[Continued on next page]

(54) Title: **TARGET TRACKING METHOD AND APPARATUS FOR RADIATION TREATMENT PLANNING AND DELIVERY**



(57) Abstract: A target treatment apparatus for treating a target region (130) within a subject (140) is provided. The apparatus includes an MRI apparatus (100) for generating MR images during an MR scan of the subject disposed within an examination region (110). The apparatus further includes an MRI localizer (150) for receiving the image data from the MRI apparatus wherein the target (130) is localized and a reference marker localizer (160, 160') for non-invasively receiving reference data from a plurality of reference points disposed in proximity to the target wherein the reference points are localized. A tracking processor (300) is also included in the apparatus for receiving localized data from the MRI localizer wherein a relationship between the reference markers and the target region is generated.

WO 2005/030330 A1



European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declaration under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM,

ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

Published:

- with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.